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co-laborers working upon abundant material from all parts of Europe, from the arctic regions, and from the United States, multiplied several times within a few years the number of fossil plants known to science; so that by the time of the completion of Schimper's '*Traité de paléontologie végétale*,' in 1874, he found that he had been able to describe in that work about six thousand good species, after a liberal exclusion of uncertain forms. But a thorough inspection of this important work shows that even then he came far short of gathering in all the data extant at that date, while it is since then that most of the solid work in this line has been done in America and in the polar districts.

A catalogue of all the fossil plants that have been described, down to the present year, is in prepara-

ends nearly thirty years ago, soon after the accession of the late Dr. Stearns to the presidency of the college, when, in the year 1859, the board of trustees created the department of physical education and hygiene. Prescribed physical training four times weekly was constituted a part of the regular college course, and has been maintained under the immediate personal superintendence of a regularly educated physician, who exercises, in addition, a general oversight of the health of the college. And it is worthy of note here, that, while the experience of similar institutions elsewhere has often been very different, no epidemic has visited this college for the past twenty-five years, nor has any serious or permanent injury ever happened from the gymnastic exercises, either required or voluntary. From the outset the department which



THE NEW AMHERST GYMNASIUM.

tion at the National museum; and, though still far from complete, the work has sufficiently progressed to warrant an approximate estimate of the present number of species, which cannot fall far short of nine thousand, and may considerably exceed that figure.

PHYSICAL TRAINING AT AMHERST.

THE recent inauguration of the new health-building at Amherst college is a noteworthy feature in the development of this department of collegiate institutions in general. Amherst college was, it will be remembered, the first institution of the kind in America to awaken to the practical necessity of a competent physical culture proceeding simultaneously with the intellectual development of its students; and effective measures were taken to secure these

had to do with the physical education of the student has been on equal footing with the other departments of collegiate instruction, and the facts of the relative attendance upon the required exercises in light gymnastics show that this position of the department is fully and cheerfully recognized by the students.

While in the conduct of the affairs of the new health-building, or Pratt gymnasium, — the gift of Mr. Charles M. Pratt of Brooklyn, — no radical change is contemplated, there is, with a greatly larger structure, more completely specialized apparatus, and all the conveniences for promoting bodily health as well as fostering physical development, a vast field for amplification of the work of the department which it is now in the strongest position to occupy. The interior arrangements of this structure present much that is new in college gymnasiums; and nothing has been spared to provide the most suitable forms of

every thing useful. In addition to the attendance upon the prescribed gymnastic exercises, it is found that a large proportion of the students, of their own accord, make use of the facilities here afforded for the acquirement of a complete physical development, and the maintenance of good health.

Not among the least of the far-reaching results of the work of this department is the uniform series of vital statistics obtained from all students of the institution, and which consist of a permanent record of certain bodily measurements and tests of the vital organs made three times during the course of the student at college. Since the inception of the department, nearly three thousand different men have been measured on a systematic plan, and the results have already formed the basis of invaluable contributions to anthropometry. The accompanying illustration is reproduced from a photographic view of the north front of the gymnasium.

SCIENCE AND SURGERY: A TRIUMPHANT RESULT OF EXPERIMENTAL RESEARCH.¹

FROM the earliest ages, the functions of the brain have been a fascinating study to cultivated minds, and the greatest intellects of all ages have occupied themselves in attempting to solve its difficult and complicated problems. With the ancients this was a favorite pursuit, and engrossed the thoughts and talents of their most illustrious philosophers. Owing to the absence of exact methods of scientific observation and experiment, the conclusions on this subject were for many centuries of a purely speculative character, and the errors and fallacies thus deduced have been handed down and accepted till comparatively recent times.

Modern investigations have, however, thrown a flood of light on the question; and, although much still remains in the dark, the former obscurity has of late years been brightly illumined by the lamp of science. The accumulated clinical experience of ages had left knowledge on the cerebral functions in a state of confusion and uncertainty; and, owing to the obvious difficulties and complications associated with disease, the results, however significant, were at best imperfect. That the brain should be subjected to direct physiological experiment, was, until modern times, never attempted. During the last generation only, has the practicability of this been demonstrated; and numerous observers have, by direct operations on the brain-substance of animals, arrived at new conclusions as to its functions, and greatly revolutionized our ancient conceptions on the subject. Evidence has also been given against the *noli me tangere* theory, and abundant proof has been adduced of the fact that the brain may be handled, irritated, or partially destroyed, without necessary danger to life.

One of the latest developments of this method of investigation has been the discovery of those centres

in the cortex which preside over voluntary motion, which have been, more especially by Professor Ferrier, differentiated and localized with great precision. This important knowledge has been arrived at by an extended series of experiments conducted on living animals, in which, by observing the several effects of stimulating or destroying limited areas of their brains, the different functions of these special localities have been determined. A topography of the cerebrum has thus been constructed, in which the various faculties have been mapped out; but these, unlike the illogical visions of the phrenologists, have stood the test of sceptical criticism and rigid experimental inquiry.

Researches of a purely scientific nature, carried out only with the object of elucidating truth and advancing knowledge, without immediate prospects of material gain, have in this instance led to most important and useful practical advantage. Armed with the knowledge acquired on animals in the laboratory, the physician has been enabled to utilize at the bedside the conclusions thus arrived at for the service of human beings. Clinical experience, combined with morbid anatomy, had already enabled the medical man to suspect the presence of disease in the brain; but as to its precise locality he was formerly in doubt. Now, however, guided by the recent revelations of physiology, he is enabled to predict the position in a large number of cases with great certainty and precision.

Evidence of this is afforded by the proceeding adopted in a case of disease, notice of which has lately appeared in the medical papers. It appears that a man presented a series of symptoms which enabled Dr. Hughes Bennett to diagnose a tumor of the brain, that it involved its cortical substance, that it was probably of limited size, and that it was situated at a certain definite spot. The skull was trephined over the suspected region: there a tumor was found and removed. On recovering from the immediate effects of the operation, the patient was, and continued for three weeks, in a satisfactory condition. He was perfectly intelligent; his functions, except for certain defects of motion caused by the disease, were normally performed; and there was an absence of all the distressing symptoms from which he had formerly suffered, and from which he must necessarily soon have succumbed. Unfortunately, at the end of this time a complication incident to all serious surgical operations supervened, from which the patient ultimately died. The unhappy termination of this particular case does not in any way detract from the importance of the principles which it involves. It still remains a signal triumph of diagnostic accuracy,—a precision mainly attained by exact experimental research. It is, moreover, further proof, that, by utilizing this improved knowledge, the surgeon may not only remove disease from the brain, but may do so without necessary shock or risk to the nervous system; and that the procedure, under modern antiseptic precautions, need not be attended with greater danger than may follow any other severe surgical injury.

¹ Reprinted from *Nature* of Jan. 8.